Attorney Docket No.: 02.36US PATENT

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of: Popescu, et al.

Serial No.: 10/728,508 Group Art Unit: 1653

Filed: December 5, 2003 Examiner: Kosson, Rosanne

For: Method of Curl Retention in Hair and Lashes

**AMENDED APPELLANT'S BRIEF**

**PURSUANT TO 37 CFR 41.37**

Assistant Commissioner of Patents and Trademarks

Attention: Board of Patent Appeals and Interferences

Washington, D.C. 20231

Dear Sir:

Appellants hereby submit an amended appeal brief to the Board of Patent Appeals and Interferences in response to a Notification of Non-Compliant Appeal Brief (37 CFR 41.37, hereinafter "the Notification") dated August 25, 2006. Appellants previously submitted a first amended appeal brief on August 10, 2006, and an initial appeal brief on July 17, 2006 regarding the final rejection of claims 1 to 18 in the present application in the decision of September 8, 2005. In the present Notification it has been found that the first amended brief does not a) contain the items required under 37 CFR 41.37(c) or the items are not in the proper heading or in the proper order; b) contain a correct copy of the appealed claims as an appendix thereto (37 CFR 41.37(c)(1)(viii)); and c) Claims 19 and 20 have been withdrawn and should not be listed in the claims appendix. The Claims Appendix is amended to remove the withdrawn claims from the list of claims. The brief otherwise contains the items required under 37 CFR 41.37(c), and the items are believed to be under the proper heading and in the proper order.

The due date for complying with the provisions of 37 CFR 1.192(c) is believed to be one month from the mailing of the Notification, September 25, 2006. Therefore, no fee is believed to be due. If however, a fee is due, please charge the fee to deposit account 05-1320.

Please see the table of contents below.

## REAL PARTY IN INTEREST

The name of the real party in interest in this appeal is Color Access, Inc., the assignee of the application.

## RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences relating to the instant application that would directly affect, be directly affected by, or have a bearing of any kind on the Board's decision in this appeal that are known to Appellants.

## STATUS OF CLAIMS (PREVIOUSLY AMENDED)

Claims 1 to 18 remain pending and rejected in the application. Claims 19 and 20 are withdrawn from consideration as a result of an election made to the claims in a Response to a Restriction Requirement submitted July 16, 2004. All pending claims, a copy of which is attached hereto, are included in this appeal.

## STATUS OF AMENDMENTS (PREVIOUSLY AMENDED)

In response to the Office Actions of January 31, 2005, and of August 17, 2005, no amendments were made to Claims 1 to 18. Claims 19 and 20 are withdrawn from consideration as a result of an election made to the claims in a Response to a Restriction Requirement submitted July 16, 2004. All pending claims, a copy of which is attached hereto, are included in this appeal.

## SUMMARY OF THE CLAIMED SUBJECT MATTER (PREVIOUSLY AMENDED)

The present invention relates to a method for retaining, enhancing or imparting curl to keratinous material such as the hair or eyelashes by applying to the keratinous material a composition containing a retention-effective amount of the enzyme transglutaminase. This is described in the present specification at page 1, line 34 to page 2, line 4. and at page 4, lines 18 to 32. None of the dependent claims that are separately argued include a means plus function or a step plus function.

## GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The outstanding issue, according to the references presented in the Advisory Action of February 8, 2006, is whether Claims 1 to 18 are rendered obvious by Richardson et al. (U.S. Pat. 5,490,980) in view of Green et al. (U.S. Pat. NO. 5,525,336), Kanebo Ltd. (JP 02-204407, abstract), and Dane, Hair Chemistry 1.

## ARGUMENTS

### 1. Richardson in view of Green, Kanebo and Dane

#### *a. Claims 1 to 4, 6 to 13 and 15 to 18*

With respect to the Examiner's rejection based on obviousness, the references, Richardson et al. (U.S. Patent No. 5,490,980, "Richardson") in view of Green et al. (U.S. Patent No. 5,525,336, "Green"), Kanebo (JP 02-204407; English abstract, "Kanebo") and Dane, Hair Chemistry 1, The Trichological Society www.hairscientists.org/hair-chemistry.htm, (c) 2000, printed from the Internet on July 26, 2004 ("Dane"), are cited by the Examiner. Appellants note that in the Final Office action of September 8, 2005, the rejection of these claims also included the record for transglutaminase from BRENDA, http://www.brenda.uni-koeln.de/php/result_flat.php4?ecno-2.3.2.13, printed July 26, 2004 ("Brenda"). The Brenda reference is not mentioned in the Advisory Action. In addition, Appellants note that in the Advisory Action, Voet et al. is mentioned but is noted by the Examiner as discussing what Dane discloses with respect to the process of perming hair. Applicants do not find the Voet reference cited in a Notice of References Cited or in an Information Disclosure Statement in the prosecution history. Therefore, no further reference to Voet et al. is made in this Appeal Brief, and Brenda is discussed briefly in case there is an expectation that Appellants are aware that Brenda is intended to be incorporated in the comments of the Advisory Action without expressly mentioning it. This caution is being exercised as it is noted with respect to Claims 5 and 14 in the Advisory Action by the Examiner that the rejection of these claims is maintained because they were previously mentioned in the Office Action of August 2, 2004 on pp. 6-7, albeit not expressly addressed in the Final Office Action of September 8, 2005.

#### (i) The Richardson Reference

Addressing the substance of the obviousness rejection based on Richardson in view of Green, Kanebo and Dane (and of Brenda), Appellants first discuss the Richardson reference and the lack of teaching or suggestion therein of any *in situ* crosslinking of glutamine or lysine residues within a hair strand by any means. Richardson teaches the linking of transglutaminase to glutamine residues on *inter alia*, the hair. There are two components in Richardson, namely, a transglutaminase and an active that contains an alkylamine moiety. Richardson teaches the binding of the active onto the transglutaminase before applying the transglutaminase to the hair. Thus, crosslinking on the hair occurs between the alkylamine containing active bound to the transglutaminase and the glutamine residue. As taught in Richardson, transglutaminase is in an amount effective to catalyze the covalent bonding of the active ingredient to glutamine residues in skin. As a result the glutamine residues are occupied by the transglutaminase-bound active, and they are not available for crosslinking to lysine residues on the hair. Therefore, the Richardson reference fails to teach or suggest the present invention of exploitation of transglutaminase to retain curl in hair by virtue of the crosslinking of lysine and glutamine residues in keratin.

Further, in the Richardson reference, the transglutaminase, already bound on one site to the active, does not have the capability of crosslinking the glutamine residues. In other words, because the active is bound to transglutaminase before it is applied to the hair, the reaction upon application can go only one way between the active and glutamine residues, as taught in the Richardson reference, and not between glutamine and lysine residues on the hair. Therefore, in essence, the occupation of the portion of the transglutaminase by an active when it is applied to the target surface renders it nearly impossible to crosslink lysine and glutamine residues. Thus, crosslinking of *in situ* proteins on the hair surface is likewise nearly impossible, and there is no possibility of imparting curl or curl retention following the teachings and/or suggestions of the Richardson reference. Richardson fails to teach or suggest what effect if any transglutaminase would have on the hair in the absence of an active moiety attached thereto.

### (ii) The Green Reference

The combination of Richardson with Green, Kanebo, and Dane (and Brenda) fails to teach or suggest the present invention of topically applying transglutaminase to the hair for curl retention or curl creation. Richardson, as discussed above, teaches that transglutaminase can crosslink a residue on hair to an active. Since Richardson, as primary reference, fails to teach or suggest anything related to the curling of hair with topical application of transglutaminase in the absence of an active moiety, no *prima facie* case of obviousness can be made. First, the Green reference expressly teaches the use of transglutaminase as an alternate crosslinking agent to link lysine and glutamine residues in adjacent polypeptides (corneocytes), not the same proteins, as would be the case in linking residues within keratin. Further, the purpose alleged in the Green reference is to form a "protective layer" on the skin. However, this is contrary to the purpose of the present invention to retain a curl because it is known that moisture is anathema to curl retention. Therefore, protecting the hair shaft with a layer to retain moisture runs counter to the retention of the curl. As an exaggerated example, anyone can recognize that curly hair is less curly when it is wet than when it is dry if the curly hair is allowed to dry naturally (i.e., without treatment such as chemicals, or drying with a process of brushing or combing the curls out as taught in the Dane reference discussed below). Therefore, the Green reference fails to remedy the defect of Richardson and in fact itself, fails to teach or suggest what effect if any transglutaminase would have on hair in the absence of the corneocyte protein. Further, there is no mention in the Green reference of using transglutaminase to influence the curling of the hair, skin or nails.

### (iii) The Kanebo Reference

The Kanebo reference teaches in its abstract a hair composition comprising a transglutaminase in combination with a polyhydric alcohol, to preserve the transglutaminase, and a calcium salt to promote the activity of transglutaminase. The ability to activate transglutaminase with the presence of calcium ions is similarly taught in the

Green reference. Therefore, it does not appear that the Kanebo reference teaches anything that the other two references, namely Richardson and Green have not already taught. There is mention in the Green reference that the surface of the structure (of the hair) is densified, and that the hair has better water-retainability and moisture-retainability, and better gloss, softness and springiness. Thus, as the only improvement noted in the Kanebo reference that could possibly relate in any way to curl, the Examiner has focused on the "springiness" that Kanebo alleges to improve. The Examiner has found that a curl is springy (and flexible and bouncy), and that its length is variable, like a spring, it can be pulled out and it returns to its former shape. Further, the Examiner has also noted that springiness is curl and that straight hair is not springy. Appellants have asserted, and again assert herein, that equivalence assigned by the Examiner between springiness and curl is insupportable and further, that such a random assignment of such an equivalence between two words to support a rejection is not permissible.

A comparison of the words "springy" and "curly" reveals that the two words would not be considered equivalent in meaning or scope by one of ordinary skill in the art. A quick glance at the dictionary entry of Merriam-Webster's Online Dictionary reveals that "springy" means to have an elastic quality. Therefore, one of ordinary skill in the art would understand this word to mean that there is a flexible and bouncy nature to the thing that is springy, in this case hair. Appellants also point out that "curly" is not mentioned in the definition nor would one of ordinary skill in the art use the words "curly" and "springy" as synonyms. The "springy" quality is not inextricably bound to a description of "curly" hair. One of ordinary skill in the art would know and understand the "springy" quality to be one associated with all types of hair (Applicants previously submitted an excerpt from P&G *The World of Hair* segment on "Elasticity" wherein elasticity is referred to as "spring".) It may also be noted that the hair shaft has an inherent elastic quality to it that provides a spring to any type of hair, curly or straight (this is noted in the Dane reference which is discussed below). Specifically, the Dane reference refers to the helices formed of amino acid chains (spiral-like coil) that twist and contribute to the links which render the quality of elasticity, *inter alia*, of the hair. Thus, one of ordinary skill in the art would know and understand that both curly hair and straight hair alike can exhibit a springy nature. Furthermore, the Kanebo reference is authored by a Japanese company presumably selling or directing its products towards a consumer that has traditionally straight hair. It is unlikely that the Kanebo reference was intended to refer to curly hair as one of ordinary skill in the art would understand it, and it is equally unlikely that one of ordinary skill in the art would interpret the Kanebo reference in this manner. Therefore, the Kanebo reference like the Green reference fails to remedy the defect of the Richardson reference.

### (iv) The Dane Reference

The Dane reference is noted by the Examiner in the Advisory Action for teaching what most people now about perms.

> The hair is first curled up on rollers to create the curly shape, and then a cross-linking agent is applied that causes the formation of bonds between cysteine residues in the keratin strands. These new bonds result in the retention of the new curly shape. The perming process imparts curl to hair. One of ordinary skill in the art would have recognized that the curls are retained because of the new pattern of cross-links in the hair, not because cysteine residues have been reacted. One of ordinary skill in the art would have been motivated to use the transglutaminase cross-linking method of Richardson et al., Green et al. and Kanebo in the perming method of Dane because these three references teach that transglutaminase is an effective reagent for cross-linking hair.

The Examiner further responds to Appellants' arguments by pointing out that the Dane reference certainly discloses cross-linking to maintain shape, and that one of ordinary skill in the art would have expected hair that had been curled, or that is curly, to retain its curly shape upon being exposed to a cross-linking agent and consequently cross-linked. However, Appellants maintain that the Dane reference fails to teach or suggest the application of transglutaminase for the retention of curl, and assert that the Dane reference does not teach crosslinking for retaining curl.

The Dane reference teaches, generally speaking, three types of bonds in the hair that give hair its structure, and thereby, its strength and elasticity. With respect to the curling of hair on rollers to create the curly shape, Dane merely teaches this method to illustrate the point that the hydrogen bonds are so weak that even though straight hair can be curled by this method, using water, it is futile because any remote moisture, for example, natural humidity, cause the "curl" to drop and the hair is straight again. Further, because the nature of the dispulphide bonds remain the same with this method the hair is never really rendered curly. Rather, the straight hair is manipulated into a curl by breaking the very weak hydrogen bonds which does not last. The other main teaching in the Dane reference is with respect to the temporary dissolution of the disulphide bonds.

In the Dane reference, it is taught that the disulphide bonds can only be broken by extreme heat or chemical treatment. The Dane reference does not provide details as to how the active chemical is applied to the hair to chemically re-form the hair. Therefore, Appellants assert that the Examiner's application of the chemical treatment under conditions of curlers is misapplied. This is not taught or suggested by the Dane reference. The Dane reference is devoid as to what the particular processing steps are with respect to chemical re-formation of the hair. Indeed, the Dane reference fails to teach or suggest what the "chemical" is. This is all provided by the Examiner without any support in the Dane reference or any of the other cited references (it is noted that the other cited references fail to teach or suggest how to "perm" the hair). Adding a protective layer to the hair to enhance moisture retention is not the same as "perming" the hair. Further, as the Dane reference has pointed out, and as Appellants have noted above, the presence of moisture when attempting to curl hair is simply not desirable. Therefore, there is no motivation that one of ordinary skill in the art would have to combine the Dane reference with the other cited references. Thus, the Dane reference fails to remedy the defect of the Richardson reference, and further, fails to teach or suggest the line of reasoning presented by the Examiner.

The Examiner reasons that the transglutaminase cross-linking method of Richardson et al., Green et al. and Kanebo would be the motivation for one of ordinary skill in the art to apply it in the perming method of the Dane reference because these three references teach that transglutaminase is an effective reagent for cross-linking hair. However, as noted above, the Dane reference fails to teach or suggest what the chemical is for "re-forming" the hair to produce a permed effect on the hair. The Dane reference also does not teach or suggest that perming is brought about a cross-linking of the hair. The equivalence made by the Examiner of "re-forming" as such is taught in the Dane reference and that of "cross-linking" as such is taught in the other three references is misplaced. The only cross-linking noted in the Dane reference is the disulphide bond which the Dane reference also calls a cross-linking chemical bond, the focus of re-formation. But, contrary to the other three references, the disulphide bond (or alternatively the cross-linking chemical bond) is **broken** to form a curl (note that the other three cited references refer to **forming** a cross-linkage not breaking one). So again, one of ordinary skill in the art would have no motivation to combine these references. Thus, the combination of references cited by the Examiner, namely Richardson, Green and Kanebo in combination with Dane fail to establish a *prima facie* case of obviousness.

The Dane reference, however, provides further support for the fact that the teachings of the Richardson, Green and Kanebo references are not with respect to retaining or even making a curl. According to the Dane reference, crosslinkages are to be **broken** to really impart a curl to the hair. Therefore, the Dane reference demonstrates that the present invention is unexpected in its method of retaining a curl with the application of transglutaminase to the keratinous material. Further, the Dane reference supports Appellants arguments above that especially the Kanebo reference fails to teach or suggest a "curl" as this word would be understood by one of ordinary skill in the art because the Kanebo reference is contrary to the teachings of the Dane reference in that the Kanebo reference refers to **forming** a crosslinkage not breaking one. As also mentioned, the Kanebo reference and the Green reference teach the ability to protect the hair by retaining moisture, not curl. Therefore, Richardson in combination with the Green, Kanebo and Dane references fails to render the present invention obvious.

### b. Claims 5 and 14

Finally, the BRENDA reference only teaches a collection of information relating to the properties of various transglutaminase enzymes. The BRENDA reference fails to teach or suggest the use of transglutaminase to curl hair or to crosslink amino acids within a hair strand, or under what conditions transglutaminase might be used on the hair to achieve the heretofore undisclosed and unexpected result. In addition, the product literature for eyelash perms from E-Z Permanent Makeup (http://www.eyelashperm.com, which has an embedded link for ordering and product information at http://www.ezpermanentmakeup.com), printed from the Internet on July 26, 2004 are cited by the Examiner, similarly fails to provide any useful teachings with respect to the applicability of the present invention to the eyelashes. Since the Examiner has acknowledged that is not cited for its disclosure of specific ingredients, and since it does not disclose transglutaminase as having any effect on curling hair of any type, Appellants assert that this reference in combination with the other cited references fails to teach or suggest the present invention.

## 2. *Conclusion*

Appellants submit the claims of the present application satisfy the requirements of 35 U.S.C. §103(a) because none of the cited references teaches or suggests a method of retaining curl in a keratinous material by applying thereto a retention-effective amount of a transglutaminase. Thus, Appellants request that the Examiner's rejection be withdrawn. In light of the arguments presented above, the rejections of claims 1 to 18 based on obviousness by the Richardson reference in view of the Green, Kanebo, and Dane references (and the BRENDA reference) should be reversed as they are unfounded. The Richardson reference fails to teach or suggest any *in situ* crosslinking of glutamine or lysine residues within a hair strand. None of the secondary references remedies the defect of the Richardson reference, and the Dane reference teaches how to **break** a crosslinkage already present in the hair for the purpose of creating a curl which is contrary to the other cited references which address the issue of **forming** a crosslinkage for the purpose of retaining moisture to protect the hair. Accordingly, Appellants respectfully request that the Honorable Board reverse the decision of the Examiner finally rejecting the pending claims and declare that all pending claims in this application are allowable.

Respectfully submitted,

August 30, 2006

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## CLAIMS APPENDIX (AMENDED)

1. A method of retaining curl in a keratinous material which comprises applying to the keratinous material a composition containing a retention-effective amount of a transglutaminase.

2. The method of claim 1 in which the composition has a pH of about 6 to about 7.

3. The method of claim 1 in which the keratinous material is hair.

4. The method of claim 3 in which the application of the composition is followed by the application of heat.

5. The method of claim 1 in which the keratinous material is eyelashes.

6. The method of claim 1 in which the transglutaminase is present in the composition in an amount of about 0.001 to about 0.5% by weight.

7. The method of claim 6 in which the transglutaminase is present in the composition in an amount of from about 0.003 to about 0.3%

8. The method of claim 1 in which the transglutaminase is a microbial transglutaminase.

9. The method of claim 1 in which the transglutaminase is a mammalian transglutaminase.

10. A method of enhancing or imparting curl to a keratinous material which comprises applying to the keratinous material a composition containing a retention-effective amount of a transglutaminase.

11. The method of claim 10 in which the composition has a pH of about 6 to about 7.

12. The method of claim 10 in which the keratinous material is hair.

13. The method of claim 12 in which the application of the composition is followed by the application of heat.

14. The method of claim 10 in which the keratinous material is eyelashes.

15. The method of claim 10 in which the transglutaminase is present in the composition in an amount of about

0.001 to about 0.5% by weight.

16. The method of claim 15 in which the transglutaminase is present in the composition in an amount of from about 0.003 to about 0.3%

17. The method of claim 10 in which the transglutaminase is a microbial transglutaminase.

18. The method of claim 10 in which the transglutaminase is a mammalian transglutaminase.

**EVIDENCE APPENDIX**

NONE

**RELATED PROCEEDINGS APPENDIX**

NONE